

Application Note 51535 (Revision NEW, 10/2015) Original Instructions

LECM Application Software Loading

Optional Supplementary Information

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LECM Application Software Loading

Introduction

This Application Note focuses on loading a main or multiple module merged application through the Main Module CAN3 bus using ToolKit XCP communication. Loading applications or connecting to other modules or communications buses is not covered by this Application Note. Please contact the application developer for procedures outside the scope of this document. In order to complete this task the following items are required:

- LECM Controller and appropriate wiring
- Laptop Computer with Woodward ToolKit software, Version 4.9 or newer
- ToolKit compatible CAN communications device, see Appendix A: ToolKit Compatible CAN Communications Modules for details.
- Existing application(s) SID(s) file
- Existing application(s) Command and Response ID(s)
- If applicable, existing application specific security DLL and passwords
- New application program (*.WAPP) and SID file
- New application(s) Command and Response ID(s)
- If applicable, new application specific security DLL and passwords
- If applicable, guidance on configuring the new application(s)

Verify Control Communication

Before loading the new application or updating an application for the LECM controller, first verify communications over the Main CAN3 communication bus using ToolKit. See Table 1 below. To establish communication, connect a CAN communication device to CAN3 communication bus and a computer. Use a CAN communication device as detailed in Appendix A: ToolKit Compatible CAN Communications Modules. The CAN communication bus should use shielded twisted pair CAN cable (or equivalent) according to the J1939-11 standard and have 120 Ω terminations at each end of the bus.

LECM	USB CAN Adapter (SUB-D9 female)
J2-23 CAN Hi	7 CAN Hi
J2-24 CAN Lo	2 CAN Lo
J2-31 CAN Ground	3 CAN GND
J2-32 CAN Shield	5 Shield

Table 1. Main Module CAN 3 Pinout

Before communications can be established with the control, the appropriate application SID file(s) must be placed on one of the folders specified in the *SID file directories* list in the Options dialog box.

eneral	
Recently used tools:	1 🔷 entries
Recently used settings:	1 🗘 entries
Always connect to my	last selected network.
Always prompt for the	view after connecting.
Use full parameter nam	e as default identifier.
ile Locations	
ile Locations File Types	Location
ile Locations File Types SID file directories	Location C:\ECUFiles\SID;C:\Users\cdefoo\Desktop;C:\Ter
ile Locations File Types SID file directories Tool files	Location C:\ECUFiles\SID;C:\Users\cdefoo\Desktop;C:\Ter C:\Users\cdefoo\Desktop
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ile Locations File Types SID file directories Tool files Settings files Device Application files DataLog files	Location C:\ECUFiles\SID;C:\Users\cdefoo\Desktop;C:\Ten C:\Users\cdefoo\Desktop C:\Users\cdefoo\Desktop C:\Users\cdefoo\Desktop C:\Users\cdefoo\Desktop

Then open the existing application ToolKit tool and select the "Connect" toolbar button. Select the CAN adapter. Configure the communications panel to XCP protocol and the appropriate baud rate. The controller Command ID and Response ID will also have to be specified. The Command and Reponses IDs are application specific, consult the application developer for these values. Finally, select the connect button on the bottom of panel.

System AFR Setings Setet a network: Engine Status AFR Setings Sete System Configuration Gas Composition 12 EASYGEN 3000 EasTygen 4 Eastygen 4 E	D 🖉 🖬 📓 🖉 - 🖉 - 📓 G	0.0 - Navigation		•	😼 Connect 🚽 Disconnect 🙀
Engine Status AFR Settings See System Configuration Gas Composition 11 Seed Gas Composition 12 See EASYGEN 3000 AFR Settings EasTygen 3000 AFR Settings EasTygen 3000 Lambda Reference Koser USban Professional HS/H #0 (Channel 1) Koser Virtual #0 (System	AFR	SP	Select a network:
Engine Status AFR Settings See					Network
System Configuration Gas Composition 11 Spf CP//P Gas Composition 12 Gas Composition 12 Spr EASYGEN 3000 AFR Simple Spr EasYgen 3000 Lambda Reference Kt COMMUNICATIONS Ve / Te Calibration Kt Lambda Closed Loop Critical #0 (Channel 1) Ve/seer Virtual #0 (Channel 1) Iso Southity Closed En NOx Closed Loop Critical #0 Iso Command ID Response ID Iso Chief I Alam TECLET I Alam Iso Command ID Response ID Itecheid I Shudown Aux. Knock Alam Iso Command ID Response ID Itecheid I Shudown Auxock Alam Itecheid I Shudown Auxock Alam		Engine Status	AFR Settings	Spe	J COMI
Gas Composition 12 Gas Composition 12 FASYGEN 3000 AFR Simple Sec CoMMUNICATIONS ' Studiowns Studiowns Studiowns Arrms CELET 1 Skutdown CELET 1		System Configuration	Gas Composition 1.1	Spd F	COMP TCP/IP
EASYGEN 3000 AFB Simple EasYgen 3000 Lambda Reference K COMMUNICATIONS Lambda Closed Loop Com Gas Quality Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop Com Baud Rate: Baud 250KB# Check the devices to connect to: Alias Command D Response ID EASYGEN 3000 EASYGEN 3000 EASYGEN 3000 FA Shadoom TECLET 1 Shadoom TECLET 2 Shadoom			Gas Composition 1.2	Spc	Kvaser USBcan Professional HS/H #0 (Channel 0) Kvaser USBcan Professional HS/H #0 (Channel 1)
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CAUZ PLANT COMMUNICATIONS Ve / Te Calibration Com Gas Quality Closed Lambda Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop NOx Closed Loop Studdowns Studdowns ES FA Studdown ES FA Studdown ES FA Studdown ES FA Studdown TECJET 1 Studdown TECJET 1 Studdown TECJET 1 Studdown TECJET 2 Studdown		EasYgen 3000	Lambda Reference	k\/	
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Image: Shutdowns Aarms Image: Shutdowns Alarms Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdowns Image: Shutdown Image: Shutdown Image: Shutdown Image: Shut			Lambda Closed Loop	Tra	
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Shudowns Alarms E2FA Shudown E2FA Alardown TECLET 1 Shudown TECLET 1 Alarm TECLET 1 Shudown TECLET 1 Alarm TECLET 2 Shudown Alar. Knock Alarm TECLET 2 Shudown Alar. Knock Alarm		0			Baud_250KBit
Shutdowns Alarms E3 FA Shutdown E1 FA Alarm E3 FA Shutdown TECJET 1 Alarm E1 FC/ET 1 Shutdown TECJET 2 Alarm E1 FC/ET 2 Shutdown TECJET 2 Alarm					Check the devices to connect to:
Shudowns Alarms E3 FA Shudown E1 FA Alarm E3 FA Shudown E1 FA Alarm E1 FA Shudown TECJET 1 Alarm E1 FC/ET 1 Shudown TECJET 2 Alarm E1 FC/ET 2 Alarm Command: E1 FC/ET 2 Shudown TECJET 2 Alarm E1 FC/ET 2 Shudown TECJET 2 Alarm E1 FC/ET 2 Alarm Command: E1 FC/ET 2 Shudown Alar. Krock Alarm E1 FC/ET 2 Shudown Alar. Krock Alarm E1 FC/ET 2 Shudown E1 FC/ET 2 Alarm					Alias Command ID Response ID
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Exception and the second			O LO PAR	nerfft	Evtended Slave Identifier (hev)
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TECJET 2 Shutdown Aux. Knock Alarm Aways connect to my last selected network.		TECJET 1 Shutdown	TECJET	2 Alarm	Response:
Charles to the Charles Control New Control of the C		TECJET 2 Shutdown	Aux Kri	ick Alarm	Always connect to my last selected network.
ADX. KNOCK SHUTBOWN UNAAM		Aux. Knock Shutdown	IGNITIC	N Alarm	

If the Command and Response IDs are not set for the CAN communication adapter enter them as below. If the Command and Response ID are extended, such as ID values greater than 0x7FF, select the appropriate extended ID check box.

🍠 Connect	📈 Dis	connect			
Select a netw	ork:				
Network					
🖉 сомі					
🍃 🖉 сомт					
TCP/IP					
🛛 🏆 Kvaser U	SBcan P	rofessional	HS/H #0 (Channel	0)	
🖉 Kvaser US	SBcan P	rofessional	HS/H #0 (Channel	1)	
. Vi Kvaser Vi	rtual #0	(Channel 0)			
Protocol:		ХСР			•
Baud Rate:		Baud_250K	Bit		•
Check the de	vices to	connect to:	:		
Alias	C	ommand ID	Response ID		
177C0BF9	9 17	77C0BF9	177BF90B		
155C0BF9	9 15	55C0BF9	155BF90B		
Extended SI	lave Ide	ntifier (hex)			
V 0	omman	and: 188C0BF9			
R R	esponse	2:		188BF90B	Add
Always co	onnect t	o my last se	lected network.		

Depending on the existing application configuration, a security DLL may have to be specified before ToolKit can complete the communications connection. Place the security DLL file in the same location as the application SID file. Contact the application developer for the security DLL file. If the security DLL file is valid and in the correct location, ToolKit will establish a connection with the control. Otherwise ToolKit will indicate an error dialog.



If the incorrect baud rate or ID is specified, ToolKit will indicate a status of Connecting in the Details dialog. The CAN communications device, such as Woodward PN 5404-1324, may flash a red error light.

Network Device	Tool Devices	Application Id	Status
-188C0BF9	-		Connecting
	📝 Disconnect 🚽 Log In	🔒 Log Out 🛛 🚷 Save Values	
Connecting on Kvaser USBcan Professional HS/H #0 (Chan	nel 0) 😼 Details		

To resolve the issue, select the disconnect option and correct the baud rate or Command/Response ID values before connecting.

Depending on the existing application configuration, additional application security may be implemented in the form of user levels and passwords. Contact the application developer for the user level passwords. When communication is successful, ToolKit may require the specification of security level and password to log into the control.

Device lecm_ device. Please	e6fa 2015-08-20 : log in.	09 <mark>.48.13-188</mark> C0BF9) is a secure
Security Level:	Developer	•	
Password:	••• I	ب	

Once this has been completed, communication has been established to the control.



Saving application settings

It is recommended that the application settings are saved before an updated application is loaded into the controller. It may be necessary to save application setting from more than just the Main module. Contact your application developer about connecting and saving setting from the EID and Aux modules. To save the application settings, connect to the module, login at the appropriate user level, and then use the ToolKit menu entry "Settings/Save Settings from Device to File".



Then define the location and name of the settings file before selecting the next button on the Save Settings from Device to File dialog panel.

Ve (le Calibration	EC.	ALARMS
Save Settings from Device to File		
Settings File Selection		
Select or create the settings file to save the settings to.		
Click 'Browse' to select or create the file.		
		Browse.
Set selected directory as default directory		-1
		Cancel Next >
		il.

ve As					
DO 🔳 Deskto	ob •			✓ 4 Search De	sktop
Organize 🕶 Nev	v folder)E + (
📕 E6 FA 120877	*	Name	Size	Item type	Date modified
🕌 Projects		LECM Application Settings.wset	2,353 KB	ToolKit Settings File	9/2/2015 10:14 AM
The Charles		Downloads	1 KB	Shortcut	8/28/2014 8:27 AM
De sum entre		WISE WISE	1 KB	Internet Shortcut	9/2/2015 1:44 PM
Music		Member Guidebook	2 KB	Shortcut	2/26/2010 10:32 AM
Pictures		Network			
Subversion		1 Computer			
Videos		Chris DeFoor			
	E	Cibraries			
📜 Computer					
all OSDisk (C:)					
😪 sharedir (\\serv	vf10) (G:)				
🖵 apps (\\servf10	J) (I:)				
宁 cdefoo\$ (\\sen	√f10) (J:)				
a	-				
File name:	LECM Application Settings.wset				
Save as type:	Device Settings (*.wset)				
					-
Hide Folders				Save	Cancel

Settings File Selection	
Select or create the settings file to save the settings to.	
Click 'Browse' to select or create the file.	
C:\Users\cdefoo\Desktop\LECM Application Settings.wset	Browse
Set selected directory as default directory	
	Cancel Next >

ToolKit will require the device to be specified before a save can occur. Select the appropriate module/device before selecting the next button. ToolKit is only capable of saving settings from one device per settings file.

ĺ	Save	Settings from Device to File		
	Se	lect Device Select the device to work with and press Next.		
		Device	Status	
l		AuxKnock DT4 Stack 20Cvl 051-155C0BF9	Connected	
l		EidIgnition_DT4_3Stack_099-177C0BF9	Connected	
L		lecm_e6fa 2015-10-04 23.30.56-188C0BF9	Connected	
l				
l				
l				
l				
l				
l				
l				
L				
				Cancel Next >

Now the tool will transfer settings from the device to be saved. A note can be specified for the settings file.

Saving Settings	
Please wait	
Saving Settings	
Saving 3650 of 3650 settings	
Saving 3650 of 3650 settings.	
Saving 3650 of 3650 settings.	

Application Note 51535

Cancel N Next >



Repeat this step, as necessary, for each module in the system.

Load an Application into the LECM

To load the application with ToolKit the appropriate *.WAPP file is required to program the application into the LECM Main Module. Please follow the procedure detailed in Chapter 6 of the LECM Product Manual 26757.

<u>1</u>	
NOTICE	Do not bootstrap the controller to load the application.

Load the application into the controller using the ToolKit Load Application menu option.

*	E6 FA.wtool - Woodward ToolKit						
File	2 View Device Settings Tools Help						
	New Tool	Ctrl+N	Connect	🖌 Disconnect			
	9 Open Tool Close Tool	Ctrl+0	AD	1/0	SHUTDOWNS	TRENDING	*
H	Save Tool	Ctrl+S	Set	Pmeas / Pot	E3 FA Shutdowns	Trending Engine	
	Save Tool As		imics	CH4 / NGK	TecJet1 Shutdowns	Trending Blending	
2	Load Applination		s -1	MAP sensors	TecJet2 Shutdowns		
	1 C:\Users\cdefoo\Documents\Projects\E6 FA 120877\Software\Main E6 FA\dt3_4\E6 FA.wtool		s -2	PTP / TPS	Aux. Knock SD / Alarms		
	Exit		Set	MAT	IgnitionShutdowns		



If the Load application dialog indicates that the product identifier of the script file and the product identifier of the device do not match, cancel the application load. Contact Woodward or the application developer to resolve the issue.

Load Application	
Product Identifier Mismatch What do you want to do?	
The product identifier of the script file and the product identifier of the device do not match. The application you are loading may not be compatible with the device. To continue anyway press Next. Otherwise, press Cancel	
Cancel	>

WARNING Follow the Load Application instructions detailed in the dialog box.

WARNING To create a safe state for the LECM Ignition module, disconnect the Driver Enable Input (J5-50) from the EID module.

oad App	lication	Statistical and a second second
Loadin	g Application	
Ple	ase acknowledge the following safety warning.	
Â	The device will be shutdown while the application is loaded. Verify the controlling is in a safe state before proceeding.	at the device and what it is
-	Failure to do so may result in personal injury or damage to equipment	
		Cancel Next >

Specify the application to be loaded before selecting the next button at the bottom of the Load Application dialog box.

ad Application	
Application File Selection	
Select the application file to load.	
Click 'Browse' to select the file.	
C:\Users\cdefoo\Desktop\Lecm-e6fa Merged.wapp	Browse
E Set selected directory as default directory	PZ.
	Cancel Next >

Desktop			- 47	Search Desktop	م
Organize 🔻 New folder				955 ·	• 🔲 0
🚖 Favorites		Name	Size	Item type	Date modifie
E Desktop	1	E6_FA_EIDV095_AUXV048.wapp	4,258 KB	WAPP File	9/2/2015 2:2
100 SharePoint Sites		Lecm-e6fa Merged.wapp	4,333 KB	WAPP File	9/1/2015 8:3
🖳 Recent Places		Downloads	1 KB	Shortcut	8/28/2014 8:
😺 Downloads		WISE WISE	1 KB	Internet Shortcut	9/2/2015 1:4
📕 E6 FA 120877		🚮 Member Guidebook	2 KB	Shortcut	2/26/2010 10
📕 Projects		🙀 Network			
		🖳 Computer			
词 Libraries	=	A Chris DeFoor			
Documents		🔚 Libraries			
J Music					
E Pictures					
Subversion					
Videos					
Computer					
SDisk (C:)					
🚽 sharedir (\\servf10) (G:)					
🖵 apps (\\servf10) (I:)					
Calefons () ren f1() (1)	*	< [->.III.		
File name: E6_FA_EIDV09	5_AUXV048.wapp		-	Application Files (*.w	vapp, *.scp 💌
					- 1

Applications with security configured for loading software will require a security .dll file and password to be specified before the application loading can occur.



This password is defined by the application and may be different from the user level password.

Load Applicat	tion		
Security I Securit	L ogin ty login reques	ted.	
Programming on this device is secured. Please select the security library.			
Se	curity Library:	C:\ECUFiles\SID\e6xcp_security_v0.dll	Browse
	Password:	• •	
			Cancel Next >

Next, the Load Application dialog will give the option restore settings after loading the application. Currently ToolKit using XCP communications will not support this option. Do not select the option, instead select the next button.





Be sure the engine is shut down before downloading. Damage to the engine or other serious problems can result if the engine is running during the download procedure.

Now ToolKit will write the application to the device memory. This process can take 10 or more minutes.







During the step above, the application loading progress may appear so have stoppped. Be patient as this process may take several minutes.

oad Application	
Loading Application Please wait	
Writing to Memory	
4308 KB of 4357.993 KB	
	Cancel Next >



Next, verify the application communicates by connecting to the device using ToolKit and the new application communications configuration.

	D. C.		÷		Ealact a maturadu		
speed		System	AFR	SP	Network		
Pmeas	10V	Engine Status	AFR Settings	Spe	S COM1		
Throttle Actuator		System Configuration	Gas Composition 1.1	Spd F	COM7		
Tecjet Position	24		Gas Composition 12	Sec	😪 Kvaser USBca	n Professional HS/H #0 (Channel 0) n Professional HS/H #0 (Channel 1)	
TecJet Command	NVs		Gua composition 1.2		😨 Kvaser Virtua	#0 (Channel 0)	
Misfire		EASYGEN 3000	AFR Simple	Spo	🖉 Kvaser Virtua	#0 (Channel 1)	
FGP	kPa	EasYgen 3000	Lambda Reference	k\			
FGT		CAN2 PLANT COMMUNICATIONS	Ve / Te Calibration	k\/			
PTP.	kPa		Lambda Closed Loop	Tra			
MAP	kPa		Gae Quality Closed	Com			
MAT	°C		Loop	Ba			
ECT			NOx Closed Loop	L	Protocol	XCP.	•
Global Timing	"CĂ				Raud Pater	Raud 250KPH	
Lambda Measured					Charle the devices		
02	% ;				Alias	Command ID Response ID	
NOx measured	opm				☑ 188C0BF9	188C0BF9 188BF90B	
CCorr GQCL		Shutdowns	Alarms				
CCorr		E3 FA Shutdown	O E3 FA A	lann			
CCorr		E3 FA Shutdown	O TECJE	1 Alarm	Extended Slave	ldentifier (hex)	
NOxCL		TECJET 1 Shutdown	TECJE	2 Alarm	Comn Respo	nand:	- Ada
		TECJET 2 Shutdown	🔘 Aux. Kn	ock Alarm	Kespe		Add
Seq State	Run 🔘	Aux. Knock Shutdown		N Alarm	Always conne	ct to my last selected network.	
Eng	OilPmp	Charities Chuide				S Connect	

NOTICE

The new application may utilize a differnet baud rate. It may be necessary to isolate the main module CAN3 communications bus if a module CAN baud mismatch occurs.

Configuring the New Application

The new application may have to be configured before operating the control. This process can be accomplished several ways. The application can be configured by manually entering values into the service tool for each module. Or the settings file, **.wset*, can be loaded into application using ToolKit.

Loading Settings files into a Module

For each device, connect to the appropriate module and use the ToolKit menu entry "Settings/Loading Settings File to device".



The application settings file, *.wset, will have to be specified on the computer.

Load Settings File to Device	
Settings File Selection	
Select the settings file to load.	
Click 'Provine' to select the file	
	Browse
Set selected directory as default directory	
	<u>C</u> ancel <u>N</u> ext >

Open	100 / B			×
💽 🗢 🔳 Desktop 🕨	24.7	• +j	Search Desktop	Q
Organize 🔻 New folder				
☆ Favorites	Name	Size	Item type	Date modified
	LECM Application Settingswset	2,353 KB	ToolKit Settings File	9/2/2015 2:30 F
🣜 Libraries	Downloads	1 KB	Shortcut	8/28/2014 8:27
Documents	😹 WISE	1 KB	Internet Shortcut	9/22/2015 4:52
🚽 Music	🛃 Member Guidebook	2 KB	Shortcut	2/26/2010 10:3
E Pictures	📬 Network			
🗟 Subversion	💻 Computer			
Videos	🔒 Chris DeFoor			
	🥽 Libraries			
1 Computer				
SDisk (C:)				
🚽 sharedir (\\servf10) (G:)				
🚽 apps (\\servf10) (l:)				
🖵 cdefoo\$ (\\servf10) (J:)				
💷 Apple iPhone				
🗣 Network				
	•	111		- F
File name: LECM Application Settings.wset		•	Device Settings (*.wset	t) 🔻
			<u>O</u> pen ▼	Cancel

Load Settings File to Device	
Settings File Selection	
Select the settings file to load.	
Click 'Browse' to select the file. C:\Users\cdefoo\Desktop\LECM Application Settings.wset	Browse
	Cancel Next >

ToolKit will compare the specified settings file to the application SID file. If any parameter differences are detected, they will be identified by the Resolve Differences dialog, accessed by pressing the resolve differences button in the Load Settings File to Device dialog.



Name	Value			Name	Value
BOOST.BOOST_FF_AT_MAX_	10			BIAS_PWM.USE_PWM_SPD_BIAS_	false
BOOST.BOOST_FF_AT_MIN_	100			BOOST.BOOST_FF_H	<table></table>
BOOST.THROT_FF_MAX_	100			BOOST.MAT_FF_H	<table></table>
BOOST.THROT_FF_MIN_	0			CAN2.CAN_BAUD_	250k
BOOST_FB.AI_DFLT	-1		Map	CAN3.CAN_BAUD_	250k
BOOST_FB.ERR_DLY_D	1			CAN4.CAN_BAUD_	1000k
BOOST_FB.ERR_DLY_U	1			CH4.DENSITY_	0.78
CAN_J1939.RSH_IN_	1.4			CH4.K_FIXED_	1.3
CAN4.CAN_BAUD	1000k			CH4.K_HIGH_	1.3
CAT_TEMP.AI_CAL	<table></table>			CH4.K_LOW_	1.3
CAT TEMP.AI UMAX	93	*		CH4.L STOICH	9.82
etting Name Mappings				Val	Unma

Review all settings differences and warnings specified by the Resolve Differences and Settings Conversion Finish dialogs.





The application developer must give guidance about managing application settings.

Follow the Warning dialog instructions.



Now ToolKit will transfer the application settings to the device.



When loading application settings using the XCP protocol, the control may not save and/or reset but will indicate the following dialog.

Load Settings File to Device	
Finished	
The device is unable to complete the settings load. The attempt to reset the device failed.	
Close	

In this instance, the application settings were saved but the module must still be reset before proceeding. The method for saving settings and resetting the module may be application specific. In some instances, the module can be reset using the service tool.

Save to NV Memory and Reboot	Apply	Cancel
Click to Confirm>	Apply	Cancel

Appendix A: ToolKit Compatible CAN Communications Modules

ToolKit supports IXXAT VCI 3, Kvaser CANlib 5.1, and RP1210B, which allows ToolKit to work with a variety of IXXAT, Kvaser, and RP1210 CAN interfaces. See ToolKit help for details.

Table 2. Kvaser CANlib 5.1 compatible devices available from Woodward:

Item Number	Description
5404-1189	Kvaser LeafLight - Isolated
5404-1324	Kvaser USBcan Professional - Isolated Dual Channel
5404-1325	Kvaser USBcan Rugged - Isolated Dual Channel IP67

We appreciate your comments about the content of our publications. Send comments to: <u>icinfo@woodward.com</u>

Please reference publication 51535.





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